

TECHNICAL REPORT

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AD

FOOD PREFERENCES OF MILITARY MEN, 1967

by

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UNITED STATES ARMY
NATICK LABORATORIES
Natick, Massachusetts 01760



Pioneering Research Laboratory

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U. S. Army Natick Laboratories

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Appendices

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Introduction

The Army must insure that its soldiers receive acceptable and nourishing foods. In order to determine the acceptability of its menus, the Army has traditionally relied upon periodic sampling of soldiers so as to determine preferences for specific food items. This survey, as well as the previous ones (1950a, 1950b, 1951a, 1951b, 1959, 1960, 1963), was designed to provide the Army with an index of acceptability for *food names*, which would in turn serve to assess how soldiers like the foods of their menus. The 1960 and 1963 surveys examined in detail several hundred food names, which were classified into discrete representative groups. The responses were analyzed according to foods, with subsequent evaluations of acceptability correlated with other subject variables such as birthplace, length of service, etc. In the 1960 and 1963 surveys a number of different questionnaire forms were tried in order to determine the reliability of the Hedonic Scale procedure for preference testing. Several studies were also performed to determine the optimum method for presenting the questionnaire forms. The reader should consult the 1963 survey for further details.

In these two surveys, as in the present (1967) one, the "9 Point Hedonic Scale" (Peryam & Pilgrim, 1957) was used as the measure of preference. Appendix 1 presents a version of the scale and its use for specific items. In its present form, used for both survey and laboratory testing, the scale comprises nine categories of acceptance. The lowest four indicate ordered degrees of dislike; the highest four indicate ordered degrees of like, and the middle is a neutral category. For simplicity, the categories are each provided with a modifying word to assist the respondent in making his preference judgment.

The present survey supplements the larger version (1963). Several foods were repeated, with the food names either remaining the same, or similar to those used before. Because of the published information on reliability, only one version of each test form was used.

Method

Eight thousand military respondents rated the food names using the Hedonic Scale. Each respondent was provided with a list of forty foods, and asked to indicate on the scale his degree of like or dislike for each food. Six different lists were used (Appendix 2) but no attempt was made to randomize the different types of foods within a single list. As a result, some respondents received lists containing primarily breads and fruits (e.g., list 3), whereas others received lists containing primarily meats and desserts (list 1). The total number of food names surveyed was 202. Some foods appeared on more than one list.

The survey was part of a periodic sampling of soldiers' attitudes toward the Army, as well as questions pertaining to demographic information. The questionnaires were distributed by the Department of Defense to various Army installations, according to AR 600-45 (date 17 August 1965), and the results were forwarded to the U.S. Army Natick Laboratories for computer analyses.

Analysis

1. For each food, the following statistics were computed:

- a) arithmetic mean (average) of the hedonic ratings
- b) total number of respondents
- c) number of respondents answering 'not tried' for each food
- d) standard deviation of the ratings (a measure of the variability of ratings).

Results

Appendix 3 presents the tabulated preference ratings for the entire set of foods surveyed in 1967. To facilitate comparison, previous ratings for equivalent food names are presented in the final two righthand columns. Abbreviation 'I' indicates that the food name was identical to the previous survey, whereas 'S' indicates that the food was the same although the wording was slightly changed. Other data about previous Hedonic ratings may be obtained directly from earlier reports.

Stability of Preferences

Appendix 4 summarizes the changes in ratings that occurred for foods sampled in 1960 and 1963, compared to 1967. The differences of ratings for 66 foods have been classified in three ways:

- a) those in which the 1967 score exceeded the earlier one
- b) those in which the 1967 score was lower than the earlier one
- c) differences without attention to direction

For simplicity, the differences have been reported in tenths of a scale unit.

From Appendix 4 it is reasonable to assume that the Hedonic Scale can provide a reproducible index for the preference judgment of a food name. Almost 50% of the changes (without regard to direction) lie within 0.3 scale units, and virtually all differences with the exception of two foods differ by less than 0.8 units. Curiously, the differences are not symmetric. Foods that decreased in preference showed wider ranges of change (about 0.8 units), whereas those increasing in preference shifted up by a maximum of only 0.4 units.

Characteristics of Foods Responded to as "Not Tried"

Because of the continuing changes in food recipes, many items at present and certainly those in the future will not have been tried by large segments of the Army population prior to being introduced into the menu. It is instructive to see how the relatively unfamiliar foods fared in preference ratings against the more common ones.

In the present survey a number of specialty items, particularly starches and desserts, were not tried by many respondents (i.e., up to 20% of the soldiers). A general

characteristic of these foods is that they are, on the average, rated lower than foods from popular classes. This tendency may be a systematic bias on the part of the respondent to underrate unfamiliar foods, and might not truly reflect the actual preference. On the other hand, it is quite possible that soldiers highly rate the most familiar food items (e.g., milk) because they actually prefer these foods to the unfamiliar ones. A food such as spinach with cream sauce thus would be underrated because it has been tried and is disliked.

Because of continuing developments of new foods for military recipes it is important to determine which of the two above-mentioned possibilities actually is responsible for the lower ratings of relatively unfamiliar foods. If, in fact, there tends to be bias against giving high ratings to unfamiliar but palatable foods, then these foods may continue to be served infrequently, thus creating a vicious circle.

Extremes in Food Preference

Appendix 5, summarizes those foods that were rated highest (Part A) and lowest (Part B) on the three preference surveys. The ratings obtained in 1960 and 1963 are included with those obtained here in order to present a rank order of the extremes of preference in both directions.

Foods liked best form a heterogeneous class of items, with no single food group being over-represented. According to Appendix 5, there is no rule that ties together these best-liked foods, except, perhaps that they are relatively common and do not have complex formulas. Only turkey and roast beef sandwiches contain sauces.

Vegetables and unfamiliar foods are most prevalent in the group of least-liked foods. Virtually all of these foods were rated between 4.0 and 5.0, suggesting a lower overall range of 'dislike'. In contrast, the acceptable foods were rated at 5.0 and above, with several as high as 8.0. Therefore, the Hedonic Scale may not provide a sufficiently precise index for the lower levels of acceptance. In numerous tests at the Acceptance Laboratory of the U. S. Army Natick Laboratories, respondents almost always reduce the Hedonic Scale to seven categories, rather than use the original nine. Only infrequently do respondents use the categories 3, 2, and 1 to indicate their preference responses to foods (Moskowitz & Meiselman, unpublished observations).

Discussion

1. Applicability of Survey Findings to Menu Planning

Because the judgments of food preference provide numerical indices of how well different foods are liked, the present and previous survey results may be used to guide the selection of items for a menu. A reasonable approach is to select the most popular food from each class and serve them frequently, while placing the less popular items on the menu more infrequently. Little work has been done to guide menu planning on the basis of these Hedonic judgments, although the logical extension of serving the most popular food items almost exclusively could lead to their eventual rejection because of food monotony.

Supplementary work is underway at the U. S. Army Natick Laboratories to provide a measure of 'How Often' a respondent would like to be served each food item. A combination of this with the Hedonic Scale provides a more accurate index of acceptability to menu planners using such survey data.

2. New Approaches to Acceptance Scaling

The developing complexity of food planning for the Armed Forces requires more sophisticated means for assessment of preferences. One approach, the scale of desired 'frequency-of-serving' was mentioned above. The second is a new technique derived from sensory psychology called 'ratio scaling'. Ratio scaling is designed to find out how many times more one food is preferred to another (Moskowitz & Sidel, 1971). The ratio might indicate to the menu planner, for example, that hamburger is liked twelve times more than liver, whereas hamburger is liked only 50% as much as steak. The great advantage of ratio scaling is that it might eventually be useful in setting up standards for acceptability in menus, much as there are presently standards for loudness (the sone scale). The Hedonic Scale, in contrast, can indicate only different verbal categories of acceptance, rather than ratios of acceptance.

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Appendix 1. Hedonic Scale as Used to Survey Menu Items

	9	8	7	6	5	4	3	2	1
Never Tried	Like Extremely	Like Very Much	Like Moderately	Like Slightly	Neither Like nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Dislike Extremely
	Pumpkin Pie								
Never Tried	Like Extremely	Like Very Much	Like Moderately	Like Slightly	Neither Like nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Dislike Extremely
	Brown Sugar Cake								
Never Tried	Like Extremely	Like Very Much	Like Moderately	Like Slightly	Neither Like nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Dislike Extremely
	Chiffon Pie								
Never Tried	Like Extremely	Like Very Much	Like Moderately	Like Slightly	Neither Like nor Dislike	Dislike Slightly	Dislike Moderately	Dislike Very Much	Dislike Extremely
	Bread Pudding								

Appendix 2. Lists of Foods Surveyed in 1967

FORM 1

Position	Food No.	Food Name
1	1	Shrimp Cocktail
2	2	Hot Spiced Tomato Juice
3	3	Fresh Fruit Cup
4	4	Spiced Fruit Cup
5	5	Tomato Juice Cocktail
6	6	Bread Pudding
7	7	Fruit Gelatin
8	8	Gingerbread w/Lemon Sauce
9	9	Baked Custard
10	10	Chocolate Pudding
11	11	Rice Pudding
12	12	Cheese Apple Crisp
13	13	Peach Shortcake (over sponge cake)
14	14	Ice Cream Sundae
15	15	Orange Sherbert
16	16	Brownies
17	17	Iced Doughnuts (dessert)
18	18	Canned Black Berries (dessert)
19	19	Peach Shortcake over Baking Powder Biscuits
20	20	Apple Turn Overs
21	21	Meat Sauce and Spaghetti
22	22	Corned Beef Hash (dinner or supper)
23	23	Creamed Chipped Beef (dinner or supper)
24	24	Spaghetti and Meat Balls
25	25	Chicken or Turkey Hash
26	26	Meat Loaf
27	27	Barbecued Beef on Bun
28	28	Chili con carne
29	29	Hot Beef Sand. w/Gravy
30	30	Hamburgers
31	31	Cheeseburgers
32	32	Hot Turkey Sand. w/Gravy
33	33	Grilled Ham and Cheese Sand.
34	34	Hot Pork Sand. w/Gravy
35	35	Grilled Cheese Sand.
36	36	Hot Fish Sand.
37	37	Creamed Turkey over Biscuit
38	38	Frankfurters w/Cheese and Bacon
39	39	Frankfurters Baked w/Sauerkraut
40	40	Vealburgers

FORM 2

Position	Food No.	Food Name
1	41	Iced Coffee
2	42	Hot Cocoa
3	43	Hot Coffee
4	44	Hot Tea
5	45	Iced Limeade
6	46	Iced Tea
7	47	Iced Fruit Punch
8	48	Pumpkin Pie
9	49	Chiffon Pie
10	50	Pecan Pie
11	51	Dutch Apple Pie
12	52	Apricot Pie
13	53	Boysenberry Pie
14	54	Brown Sugar Cake
15	55	Peanut Butter Cake
16	56	Boston Cream Cake
17	57	Pound Cake
18	58	Chocolate Cake
19	59	Chocolate Chip Cookies
20	60	Spice Cookies
21	61	Ginger Cookies
22	62	Fruit Bars (cookies)
23	63	Lemon Cookies
24	6	Bread Pudding
25	14	Ice Cream Sundae
26	64	Sherbert
27	65	Roast Lamb
28	66	Grilled Lamb Chop
29	67	Corned Beef
30	68	Barbecued Spare Ribs
31	69	Fried Chicken
32	70	Sweet and Sour Pork
33	71	Roast Veal
34	72	Veal Steak w/Sour Cream Sauce
35	73	Egg Foo Yung (chopped ham, eggs, bean sprouts)
36	74	Turkey Chow Mein
37	24	Spaghetti and Meatballs
38	75	Beef Chop Suey
39	76	Suki Yaki (beef sliced thin w/onions, soy sauce and bean sprouts)
40	77	Teri Yaki Steak (swiss steak in marinated soy sauce)

FORM 3

Position	Food No.	Food Name
1	78	Cake Doughnuts
2	79	Raised Doughnuts
3	80	Whole Wheat Bread
4	81	Rye Bread
5	6	Bread Pudding
6	82	Boston Brown Bread
7	83	Corn Bread
8	84	Quick Coffee Cake
9	85	Pecan Rolls
10	86	Muffins
11	87	Cheese Biscuits
12	18	Canned Black Berries (dessert)
13	88	Canned Plums (dessert)
14	89	Canned Fruit Cocktail (dessert)
15	90	Grape Fruit Halves (dessert)
16	91	Baked Apples (dessert)
17	92	Baked Apples (breakfast)
18	93	Assorted Fresh Fruit (dessert)
19	94	Fresh Tangerines
20	95	Canned Applesauce (dessert)
21	96	Fresh Grapes
22	97	Assorted Fresh Fruit (breakfast)
23	98	Cold Cuts
24	99	Baked Hamburger and Macaroni
25	100	Beef Pot Pie
26	101	Scalloped Ham and Potatoes
27	102	Corned Beef Stew
28	24	Spaghetti and Meat Balls
29	103	Fresh Oysters
30	104	Seafood Platter
31	105	Shrimp Creole
32	106	Baked Turkey and Noodles
33	107	Scalloped Salmon and Peas over Toast
34	108	Tuna Cakes (with egg sauce)
35	109	Breaded Lamb Cutlet
36	110	Swiss Steak with Tomato Sauce
37	111	Batter Fried Liver (breaded)
38	112	Beef Paprika
39	113	Veal Steak with Cheese Tomato Sauce
40	32	Hot Turkey Sand. w/Gravy

FORM 4

Position	Food No.	Food Name
1	114	Apple Butter
2	115	Peanut Butter
3	116	Cherry Jam
4	117	Pineapple Jam
5	118	Grape Jelly
6	119	Apple Jelly
7	120	Honey
8	121	Green Olives
9	122	Ripe Olives
10	123	French Fried Potatoes
11	124	Buttered Potatoes
12	125	Mashed Potatoes
13	126	Potatoes Cheese Cakes
14	127	Glazed Sweet Potatoes
15	128	Mashed Sweet Potatoes
16	129	Marshmallow Sweet Potatoes
17	130	Baked Potatoes
18	131	Fried Rice
19	132	Spanish Rice
20	133	Hashed Brown Potatoes
21	134	Scalloped Potatoes
22	135	Scalloped Potatoes and Onions
23	136	Macaroni w/Tomato and Onions
24	137	Macaroni Salad
25	138	Macaroni and Ham Au Gratin
26	139	Macaroni and Cheese
27	140	Buttered Noodles
28	141	Scalloped Noodles w/Cheese, Tomatoes and Bacon
29	142	Fresh Sliced Tomatoes (vegetable)
30	143	Corn on the Cob
31	144	Buttered Turnips
32	145	Sweet and Sour Mustard on Turnip Greens
33	146	Sauteed Okra
34	147	Buttered Brussel Sprouts
35	148	Butter Mixed Vegetables
36	149	Mexican Corn (corn with Pimentos and Green Peppers
37	150	Fried Cabbage
38	151	French Fried Cauliflower
40	153	Normandie Carrots (carrots with thickened sauce)

FORM 5

Position	Food No.	Food Name
1	154	Cole Slaw
2	155	Wilted Lettuce Salad
3	156	Cabbage and Carrot Gelatin Salad
4	157	Carrot and Pineapple Gelatin Salad
5	158	Carrot and Raisin Salad
6	159	Cheese Stuffed Celery
7	160	Spiced Whole Apple on Lettuce
8	161	Fresh Sliced Tomatoes (salad)
9	142	Fresh Sliced Tomatoes (vegetable)
10	162	Kidney Bean Salad
11	163	Fruit and Cottage Cheese Salad
12	164	Cottage Cheese on Lettuce
13	165	Individual Fruit Salad
14	166	Tossed Pineapple Cheese Salad
15	167	Marinated Green Beans and Onions Salad
16	168	Cranberry and Orange Salad
17	169	Buttered Hominy
18	144	Buttered Turnips
19	170	Asparagus with Cheese Sauce
20	171	Buttered Peas
21	172	Buttered Broccoli
22	173	Glazed Parsnips
23	174	Baked Sauerkraut w/Apples
24	175	Buttered Peas and Carrots
25	176	Corn Pudding
26	177	Blackeyed Peas
27	178	Navy Bean Soup
28	179	Cream of Corn Soup
29	180	Beef Barley Soup
30	181	Beef Bouillion
31	182	Cream of Tomato Soup
32	183	Cream of Celery Soup
33	184	Oyster Stew
34	185	Pea Soup
35	186	French Onion Soup
36	187	Clam Chowder (with milk)
37	188	Clam Chowder (with tomatoes)
38	189	Pizza Pie
39	24	Spaghetti and Meat Balls
40	21	Meat Sauce and Spaghetti

FORM 6

Position	Food No.	Food Name
1	190	Pork Scrapple (fried corn meal mush containing pork sausage) (breakfast)
2	191	Grilled Beef Patties (breakfast)
3	192	Creamed Dried Beef
4	193	Creamed Ground Beef
5	194	Pork Sausages
6	195	Corned Beef Hash (breakfast)
7	196	Coconut Griddle Cakes
8	197	Griddle Cakes w/Fruit Sauce
9	198	Griddle Cakes w/Maple Sirup
10	199	Baked Beans (breakfast)
11	200	Fried Cornmeal Mush (breakfast)
12	201	Sweet Rolls (danish)
13	202	Hominy Grits (breakfast)
14	203	Hot Whole Wheat Meal
15	204	Boiled Rice w/Raisins (breakfast)
16	205	Hot Oatmeal
17	206	Stewed Prunes
18	207	Chilled Canned Plums (breakfast)
19	208	Hot Biscuits (breakfast)
20	209	Grape Juice
21	210	Apple Juice
22	211	Frozen Orange Juice
23	212	Canned Orange Juice
24	213	Bananas (breakfast)
25	214	Pineapple Juice
26	43	Hot Coffee
27	44	Hot Tea
28	41	Iced Coffee
29	46	Iced Tea
30	86	Muffins
31	84	Quick Coffee Cake
32	78	Cake Doughnuts
33	79	Raised Doughnuts
34	85	Pecan Rolls
35	189	Pizza Pie
36	98	Cold Cuts
37	34	Hot Pork Sand. w/Gravy
38	29	Hot Beef Sand. w/Gravy
39	24	Spaghetti and Meat Balls
40	21	Meat Sauce and Spaghetti

Appendix 3. Summary of Preferences

Food Items Surveyed (N = 202)	Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous 1960	Means 1963
I. Accessory Foods							
A. Condiments and relishes-other							
Green olives	1342	5.31	2.69	4.21	13.08	5.83 (I)	5.58 (S)
Ripe olives	1317	5.06	2.69	6.00	8.41	5.64 (S)	
B. Spreads-Fruit-type							
Apple jelly	1365	6.84	1.52	2.57	66.82		6.63 (I)
Grape jelly	1385	7.18	1.42	1.14	79.44		7.10 (I)
Pineapple jam	1292	6.08	1.91	7.78	37.85		6.28 (I)
Cherry jam	1320	6.59	1.61	5.78	59.81		6.83 (I)
Apple Butter	1239	6.72	1.59	11.56	64.95	6.91 (I)	
C. Other than fruit-type							
Peanut butter	1378	6.64	1.78	1.64	61.21	6.58 (I)	
Honey	1360	6.53	2.02	2.93	57.48		6.49 (I)
II. Beverages							
A. Fruits or Fruit Flavored							
Iced limeade	1396	7.40	1.60	2.45	85.05		6.90 (S)
Iced fruit punch	1376	7.03	1.68	3.84	72.90		7.13 (S)
Grape juice	1377	7.67	1.50	1.15	95.33		7.39 (I)
Apple juice	1345	7.33	1.79	3.45	82.71	7.00 (I)	
Pineapple juice	1374	6.98	1.89	1.36	71.50	7.61 (I)	
Frozen orange juice	1370	7.96	1.33	1.65	99.53	8.02 (I)	7.73 (I)
Canned orange juice	1373	7.75	1.41	1.44	97.20		7.41 (I)

Appendix 3. Summary of Preferences (Cont'd)

Food Items Surveyed (N = 202)	Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous Means 1960	1963
II. Beverages (Cont'd)							
B. Other than fruit							
Hot coffee	2760	6.89	2.26	2.27	67.76	7.42 (I)	7.11 (S)
Iced coffee	2150	4.15	2.49	25.75	0.47	4.15 (I)	4.00 (I)
Hot tea	2691	6.03	2.32	4.71	36.45	5.98 (I)	6.05 (I)
Iced tea	2770	7.26	2.10	1.91	80.84	6.97 (I)	
Hot cocoa	1391	7.41	1.36	2.80	85.51	7.66 (I)	
Hot spiced tomato juice	1097	5.31	2.30	24.40	13.08		
Tomato juice cocktail	1177	6.03	2.25	18.88	35.98	7.42 (S)	
III. Breads							
A. Sweet (with sugar ingredients)							
Quick coffee cake	2622	6.71	1.76	8.48	64.95	7.13 (S)	6.71 (I)
Cake doughnuts	2705	7.05	1.50	5.58	72.90	7.61 (S)	
Raised doughnuts	2677	7.07	1.62	6.56	73.83	7.49 (S)	
Pecan rolls	2729	7.17	1.73	4.75	78.97		
Sweet rolls (danish)	1363	7.70	1.34	2.15	96.73		
Iced doughnuts	1323	7.00	1.80	8.82	71.96		
B. Other breads and crackers							
Rye bread	1428	5.90	2.29	2.99	30.37	6.75 (S)	
Boston brown bread	955	5.97	1.92	35.12	34.11		
Corn bread	1455	6.59	2.13	1.15	58.88	7.07 (S)	
Whole wheat bread	1443	6.33	1.99	1.97	47.20	6.82 (S)	6.25 (I)
Muffins	2754	7.23	1.56	3.87	80.37	6.84 (S)	7.18 (S)
C. Hot Biscuits							
Cheese biscuits	940	5.39	2.20	36.14	15.89		
Hot biscuits (breakfast)	1363	7.95	1.47	2.15	99.07	8.33 (S)	

Appendix 3. Summary of Preferences (Cont'd)

Food Items Surveyed (N = 202)		Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous 1960	Means 1963
IV. Cereals								
A. Hot								
Hot whole wheat meal		1216	5.94	2.22	12.71	32.71		
Oatmeal		1350	6.59	2.06	3.09	59.81	6.13 (I)	6.02 (I)
Fried corn meal mush (breakfast)		922	4.43	2.44	33.81	1.40		
V. Desserts								
A. Cakes								
Brown sugar cake		1203	6.18	1.80	15.93	39.72		
Peanut butter cake		1166	5.98	2.15	18.52	34.11		
Boston cream cake		1159	6.87	1.89	19.01	67.76		
Pound cake		1310	6.63	1.86	8.46	59.81		
Chocolate cake		1415	7.47	1.60	1.12	86.92	7.67 (I)	7.43 (I)
Peach shortcake (over sponge cake)		1202	6.72	1.99	17.16	65.89	7.76 (I)	
Gingerbread with lemon sauce		1201	6.47	2.04	17.23	52.80	7.07 (I)	6.91 (S)
B. Cookies								
Spice cookies		1330	6.65	1.69	7.06	61.68	6.91 (I)	
Ginger cookies		1365	6.57	1.81	4.61	58.88		
Lemon cookies		1233	6.26	1.90	13.84	44.39		
Brownies		1414	7.31	1.71	2.55	81.78	6.99 (I)	7.27 (S)
Chocolate chip cookies		1405	7.64	1.44	1.82	92.52	7.61 (I)	
Fruit bars		1241	6.16	1.94	13.28	39.72		
C. Cobblers and Pies								
Chiffon pie		1242	6.71	1.77	13.21	64.02		
Pumpkin pie		1378	6.95	2.02	3.70	70.09	7.28 (I)	

Appendix 3. Summary of Preferences (Cont'd)

Food Items Surveyed (N = 202)	Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous Means 1960	1963
V. Deserts (Cont'd)							
C. Cobblers and Pies (Cont'd)							
Pecan pie	1284	6.69	2.05	10.27	64.02		
Dutch apple pie	1321	7.45	1.47	7.69	85.51		
Apricot pie	1250	5.81	2.22	12.65	27.10	6.16 (I)	6.13 (I)
Boysenberry pie	858	5.95	2.21	40.04	32.71		
Apple turnover	1398	7.60	1.45	3.65	92.52		
Cheese apple crisp	1110	6.27	2.20	23.50	44.86		
D. Ice cream							
Ice cream sundae	2780	7.78	1.34	3.54	97.66	8.24 (I)	
Orange sherbert	1385	7.13	1.79	4.55	75.70	6.90 (I)	
Sherberts	1344	7.14	1.75	6.08	76.17	6.50 (I)	
E. Gelatins							
Fruit Gelatins	1265	6.66	1.83	12.82	62.15		
F. Puddings							
Bread Puddings	3834	5.93	2.28	11.94	31.78	6.42 (I)	6.43 (I)
Chocolate pudding	1422	7.16	1.82	2.00	78.04	7.16 (I)	
Rice pudding	1370	6.09	2.40	5.58	38.32	6.10 (S)	
Baked custard	1287	6.30	2.08	11.30	45.79	6.92 (I)	
VI. Fruits							
A. Fresh							
Fresh grapes	1443	7.64	1.42	1.97	92.52	7.66 (S)	
Fresh tangerines	1396	7.65	1.57	5.16	93.93	7.40 (S)	
Fresh fruit cup (breakfast)	1440	7.66	1.36	2.17	94.86		
Fresh fruit cup (dessert)	1456	7.56	1.38	1.09	93.93		

Appendix 3. Summary of Preferences (Cont'd)

Food Items Surveyed (N = 202)		Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous Means 1960	Means 1963
VI. Fruits (Cont'd)								
A. Fresh (cont'd)								
Bananas		1370	7.56	1.43	1.65	90.19		
Grapefruit halves (dessert)		1413	6.36	2.20	2.79	49.07	7.10 (I)	7.59 (I)
B. Canned or prepared								
Canned blackberries (dessert)		2695	6.34	2.07	7.80	47.20		
Canned plums (dessert)		1369	5.69	2.14	7.54	22.90	6.26 (I)	
Canned fruit cocktail (dessert)		1458	7.34	1.59	0.95	84.11	7.88 (S)	
Baked apples (breakfast)		1302	5.91	2.26	11.55	30.84		
Baked apples (dessert)		1417	6.48	2.06	3.74	54.67		
Canned applesauce (dessert)		1452	6.96	1.86	1.36	70.56	7.19 (S)	
Stewed prunes		1206	4.97	2.43	9.55	7.01	5.32 (I)	
Chilled canned plums (breakfast)		1251	6.00	2.20	10.91	35.51	6.26 (S)	
Spiced fruit cup		1126	6.35	1.89	22.40	48.60		
VII. Main dishes								
A. Eggs and omelets								
Egg foo young		1015	6.00	2.42	29.07	35.05		
B. Cheese								
Grilled cheese sandwich		1410	7.29	1.61	2.83	81.78		
C. Cereal-light main dishes								
Pizza		2661	7.46	1.89	3.83	85.98		7.17 (I)
Griddle cakes with fruit sauce		864	6.37	1.97	37.98	50.93		
Griddle cakes with maple syrup		1260	6.94	1.79	9.55	69.16		
Coconut griddle cakes		641	5.41	2.53	53.98	16.36		

Appendix 3. Summary of Preferences (Cont'd)

Food Items Surveyed (N = 202)		Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous Means 1960	Means 1963
VII. Main dishes (cont'd)								
D. Meats								
1. Beef								
Creamed dried beef		1152	5.41	2.49	17.30	16.36	5.09 (S)	6.18 (S)
Creamed ground beef		1221	5.60	2.46	12.35	20.56		5.88 (S)
Corned beef hash		1393	5.80	2.38	4.00	26.64		
Teri yaki steak		973	6.86	2.02	32.01	67.76		
Beef pot pie		1329	6.31	2.02	9.71	45.79	7.18 (S)	
Barbecued beef on bun		1405	7.29	1.78	3.17	81.31	7.65 (I)	
Meat loaf		1431	6.96	1.93	1.38	71.03		
Corned beef		1412	5.92	2.39	1.33	31.31	6.08 (I)	6.46 (I)
Hot beef sandwich with gravy		2751	7.68	1.40	3.27	95.33		7.76 (S)
Creamed chipped beef		1352	5.67	2.49	6.82	22.90	6.08 (S)	6.18 (S)
2. Ham								
Grilled ham and cheese sandwich		1405	7.47	1.53	3.17	87.38		
Scalloped ham and potatoes		1401	6.39	2.15	4.82	50.93	7.37 (S)	
3. Other pork products								
Barbecued spare ribs		1390	7.53	1.84	2.87	88.32	6.89 (I)	
Sweet sour pork		1229	6.41	2.14	14.12	52.34		
Hot pork sandwich with gravy		2684	7.15	1.74	5.63	77.57		
Pork sausage		1366	7.16	1.79	1.94	78.50		
4. Lamb								
Roast lamb		1279	6.43	2.35	10.62	52.80	6.13 (I)	6.35 (I)
Breaded lamb chops		1249	6.36	2.19	15.15	49.07		
Grilled lamb chops		1287	6.55	2.32	10.06	57.94		
5. Veal								
Vealburgers		1214	6.23	2.15	16.33	42.99	6.74 (I)	
Roast veal		1370	7.06	1.73	4.26	73.83	6.92 (S)	
Veal steak with sour cream		1175	6.37	2.14	17.89	50.47		
6. Liver								
Batter fried liver		1390	4.55	2.92	5.57	2.34	5.87(S)	

Appendix 3. Summary of Preferences (Cont'd)

Food Items Surveyed (N = 202)	Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous 1960	Means 1963
VII. Main dishes (cont'd)							
D. Meats (cont'd)							
7. Meat combinations							
Sukiyaki	941	6.23	2.39	34.24	43.46		
Baked hamburger and macaroni	1396	6.51	2.03	5.16	56.07		
Turkey chow mein	1184	6.36	2.19	17.26	49.07		
Beef chop suey	1270	6.47	2.17	11.25	54.21	5.71 (S)	5.95 (S)
Baked turkey and noodles	1405	6.93	1.80	4.55	69.16	6.36 (S)	5.88 (S)
Corned beef stew	1393	5.52	2.40	5.37	18.22		
Veal steak with cheese and tomato	1266	6.67	2.03	13.99	62.62		
Frankfurts with cheese and bacon	1410	7.29	1.61	2.83	43.46		
Chili con carne	1363	6.80	2.04	6.06	66.36	6.61 (I)	6.79 (I)
Cheeseburger	1431	7.50	1.61	1.38	87.85	7.52 (I)	
Swiss steak	1376	7.22	1.69	6.52	79.91	7.92 (I)	
Pork scrapple (fried corn meal mush)	681	5.15	2.38	51.11	9.81		
8. Cold cuts and sausages							
Cold cuts	2810	5.84	2.19	1.92	27.57	5.93 (I)	
9. Ground meats							
Hamburgers	1429	7.53	1.51	1.52	87.85		7.52 (S)
Spaghetti and meat balls	7035	7.54	1.69	1.21	89.25	7.47 (I)	7.47 (I)
Grilled beef patties	1152	5.41	2.49	17.30	16.36		
10. Fowl							
Chicken or turkey hash	1316	6.35	2.07	9.30	48.13		
Hot turkey sandwich with gravy	2839	7.68	1.48	2.87	96.26		
Creamed turkey over biscuits	1339	6.37	2.14	7.72	50.93		
Fried chicken	1421	7.59	1.74	0.70	92.06	8.24 (I)	

Appendix 3. Summary of Preferences (Cont'd)

Food Items Surveyed (N = 202)	Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous Means 1960	Means 1963
VII. Main dishes (cont'd)							
D. Meats (cont'd)							
11. Fish							
Shrimp cocktail	1236	7.08	2.03	14.82	74.77		
Fresh oysters	1251	5.37	3.06	15.01	14.95		
Sea food platter	1300	6.68	2.35	11.68	63.55		6.44 (S)
Shrimp creole	1220	6.51	2.48	17.12	55.61		
Tuna cakes	1118	5.36	2.49	24.05	14.49		
Scalloped salmon and peas	1114	5.27	2.55	24.32	11.68		
Hot fish sandwich	1369	6.06	2.34	5.65	37.38		
VIII. Potatoes and starches							
A. Potatoes							
French fried potatoes	1385	7.92	1.21	1.14	98.60	8.17 (I)	
Buttered potatoes	1384	7.15	1.58	1.21	77.10		
Mashed potatoes	1394	7.57	1.44	0.50	91.59	7.56 (I)	7.52 (I)
Potato cheese cake	909	5.51	2.26	35.12	18.22		
Glazed sweet potatoes	1328	6.05	2.42	5.21	36.92	6.54 (S)	6.59 (S)
Mashed sweet potatoes	1315	5.72	2.44	6.14	24.77	6.71 (I)	
Baked potatoes	1386	7.13	1.68	1.07	76.17	6.73 (S)	6.77 (S)
Scalloped potatoes	1329	6.46	1.98	5.14	52.80	6.65 (S)	
Scalloped potatoes with onions	1268	5.87	2.30	9.49	27.57		
Hashed brown potatoes	1319	7.12	1.69	5.85	75.23	7.11 (I)	
Marshmallow sweet potatoes	1026	5.46	2.60	26.77	17.76		
B. Rice							
Fried rice	1293	5.87	2.52	7.71	29.44		5.61 (I)
Spanish rice	1256	6.21	2.42	10.35	41.12	5.92 (S)	
Boiled rice with raisins (breakfast)	933	4.66	2.55	28.72	2.80		

Appendix 3. Summary of Preference (Cont'd)

Food Items Surveyed (N = 202)	Number of Respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous 1960	Means 1963
VIII. Potatoes and starches (cont'd)							
C. Other starches							
Macaroni and ham au gratin	1031	5.97	2.22	26.41	33.64		
Macaroni and cheese	1374	6.86	2.06	1.93	67.29	6.65 (S)	7.16 (S)
Buttered noodles	1300	6.30	1.97	7.21	45.33	6.18 (I)	
Scalloped noodles with cheese, tomato, and bacon	1002	5.79	2.23	28.48	24.77		
Meat sauce and spaghetti	4148	7.56	1.76	1.66	90.65		7.31 (S)
Baked beans	1111	5.16	2.49	20.24	10.28	6.17 (I)	5.71 (S)
IX. Salads							
A. Fruit							
Spiced whole apple on lettuce	1119	6.09	1.91	18.56	38.79		
Individual fruit salad	1342	7.33	1.44	2.33	82.71		7.02 (I)
Cranberry and orange salad	962	5.29	2.22	29.99	12.62		
B. Vegetable							
Cole slaw	1315	6.53	1.85	4.29	56.54	6.76 (I)	
Kidney bean salad	1180	4.87	2.41	14.12	6.54	4.87 (I)	
Marinated green bean and onion salad	1091	4.73	2.42	20.60	4.67		5.20 (I)
Wilted lettuce salad	1200	5.33	2.24	12.66	14.02		
C. Combination							
Macaroni salad	1316	6.19	2.17	6.07	41.12	6.13 (I)	5.68 (S)
Cabbage and carrot gelatin salad	1189	4.76	2.22	13.46	5.14		
Carrot and pineapple gelatin salad	1162	5.11	2.28	15.43	9.35	5.87 (S)	
Cheese stuffed celery	1232	5.75	2.42	10.33	24.77		
Fruit and cottage cheese salad	1314	5.82	2.57	4.37	27.57		

Appendix 3. Summary of Preference (Cont'd)

Food Items Surveyed (N = 202)	Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous Means 1960 1963
X. Soups						
Navy bean soup	1152	5.88	2.31	16.16	29.44	
Beef barley soup	1115	6.21	1.96	18.85	41.12	5.66 (I)
Beef bouillon	1292	6.67	2.00	5.97	45.79	
Cream of tomato soup	1211	6.31	1.95	11.86	63.08	6.88 (I)
Cream of celery soup	1154	5.53	2.28	16.01	19.63	5.42 (I)
Oyster stew	1167	5.80	2.75	15.07	26.17	5.86 (S)
Pea soup	1297	5.71	2.34	6.91	28.83	5.54 (S)
French onion soup	1147	5.62	2.42	16.52	21.96	5.86 (S)
Clam chowder with milk	1063	5.70	2.70	22.63	23.83	
Clam chowder with tomato	950	5.24	2.59	30.86	11.21	
XI. Vegetables						
A. Flower, fruit and seed						
Fresh sliced tomatoes	2720	7.55	1.73	1.98	89.25	7.90 (I) 7.81 (I)
Corn on the cob	1386	7.82	1.43	1.07	98.13	
Buttered mixed vegetables	1353	6.56	1.85	3.43	57.94	
Mexican corn	1112	6.18	2.19	20.63	39.72	
Buttered peas and carrots	1319	6.47	1.96	4.00	54.67	
Corn pudding	754	5.60	2.23	45.12	21.03	
Blackeyed peas	1182	6.18	2.29	13.97	41.12	5.93 (I)
Buttered turnip	2277	4.72	2.53	17.95	4.21	5.00 (I)
Buttered peas	1350	7.00	1.78	1.75	72.43	6.99 (S) 6.78 (S)
Buttered broccoli	1210	5.63	2.63	11.94	21.96	5.59 (I) 5.58 (I)
French fried cauliflower	1022	4.35	2.69	27.05	0.47	
Sauteed okra	750	4.83	2.71	46.47	5.61	5.35 (S)
B. Leaves and stems						
Asparagus with cheese sauce	1038	5.00	2.71	24.45	7.94	4.20 (S)
Sweet sour mustard on turnip greens	1074	4.68	2.66	23.34	3.27	
Baked sauerkraut with apples	820	4.67	2.55	40.32	3.27	

Appendix 3. Summary of Preference (Cont'd)

Food Items Surveyed (N = 202)	Number of respondents	Mean rating	Standard deviation	Percent 'not tried'	Percentile rank	Previous 1960	Means 1963
XI. Vegetables (cont'd)							
B. Leaves and stems (cont'd)							
Fried cabbage	1206	5.10	2.61	13.92	8.41		
Buttered brussel sprouts	1194	5.20	2.65	14.78	10.75	4.83 (S)	
C. Roots and bulbs							
French fried carrots	882	4.54	2.46	37.04	1.87		
Normandie carrots	894	4.79	2.39	36.19	5.61		
Glazed parsnips	819	4.41	2.35	40.39	0.93	4.06 (S)	

I = Identical Food Name
S = Similar Food Name

Appendix 4

Distribution of Differences in Preference Ratings for Food Names Previously Surveyed and Re-Surveyed in Present Study

Magnitude of Difference	Increased in Preference		Decreased in Preference		Total	
	Number	Percent	Number	Percent	Number	Percent
Less than .10	13	19.6	4	6.4	17	25.7
.10 -- .19	3	4.5	1	1.5	4	6.4
.20 -- .29	7	10.6	8	12.8	15	22.7
.30 -- .39	3	4.5	5	7.5	8	12.8
.40 -- .49	--	--	2	3.2	2	3.2
.50 -- .59	1	1.5	9	13.6	10	15.1
.60 -- .69	2	3.2	4	6.4	6	9.6
.70 -- .79	--	--	2	3.2	2	3.2
.80 -- .89	--	--	--	--	--	--
.90 -- .99	--	--	1	1.5	1	1.5
Over .99	--	--	1	1.5	1	1.5
Total	29	43.9	37	56.5	66	

Appendix 5. Part A

Foods Best Liked by Army Men: Present and Previous Surveys

Food Name	SURVEY		
	Present (1967)	1963	1960
1. Fresh milk	---	8.63*	8.60*
2. Hot rolls	---	---	8.40*
3. Hot biscuits	7.95*	---	8.33*
4. Strawberry shortcake	---	---	8.32*
5. Grilled steak	---	8.30*	8.31*
6. Ice cream	---	7.70	8.26*
7. Ice cream sundae	7.78*	---	8.24*
8. Fried chicken	---	---	8.24*
9. French Fried potatoes	7.92*	---	8.17*
10. Roast turkey	---	---	8.13*
11. Assorted fresh fruit	7.66	8.03*	---
12. Frozen orange juice	7.96*	7.73	8.02
13. Corn on the cob	7.82*	---	---
14. Apple pie	---	7.85*	7.81
15. Veal Steak	---	7.84*	---
16. Eggs to order	---	7.82*	---
17. Fresh sliced tomatoes	---	7.90*	7.81
18. Country style chicken	---	7.80*	---
19. Roast beef	---	7.79*	8.02
20. Hot roast beef sandwich w/gravy	7.68*	7.76*	---

Appendix 5. Part A (Cont'd)

Foods Best Liked by Army Men: Present and Previous Surveys

Food Name	SURVEY		
	Present (1967)	1963	1960
21. Canned orange juice	7.75*	---	7.41
22. Sweet rolls (Danish)	7.70*	---	---
23. Hot turkey sandwich w/gravy	7.68*	---	---
24. Grape juice	7.67*	7.37	---

Appendix 5. Part B

Foods Least Liked by Army Men: Present and Previous Surveys

Food Name	SURVEY		
	Present (1967)	1963	1960
1. Candied parsnips	---	---	4.06*
2. Cauliflower w/cheese sauce	---	---	4.09*
3. Iced coffee	4.15*	4.00*	4.15*
4. Asparagus w/hollandaise sauce	---	---	4.20*
5. Cabbage baked with cheese	---	---	4.30*
6. French Fried cauliflower	4.35*	---	---
7. Glazed parsnips	4.41*	---	---
8. Fried cornmeal mush (breakfast)	4.43	---	---
9. Creamed asparagus	---	---	4.47*
10. Fried parsnips	---	---	4.47*
11. Baked hubbard squash	---	---	4.50*
12. French Fried carrots	4.54*	---	---
13. Batter fried liver (breaded)	4.55*	---	---
14. Broccoli	---	---	4.56*
15. Mashed turnips	---	---	4.57*
16. Spinach w/cheese sauce	---	4.55*	4.73
17. Sour cream	---	4.60*	---
18. Boiled rice with raisins (breakfast)	4.66*	---	---
19. Baked sauerkraut with apples	4.67*	---	---
20. Sweet/sour mustard on turnip greens	4.68*	---	---

Appendix 5. Part B (Cont'd)

Foods Least Liked by Army Men: Present and Previous Surveys

Food Name	Present (1967)	SURVEY	
		1963	1960
21. Instant coffee	---	4.79*	---
22. Buttermilk	---	4.85*	---
23. Baked liver	---	4.87*	---
24. Cauliflower vegetable salad	---	4.87*	---
25. Sweet-sour cabbage	---	4.87*	---
26. Cabbage and cottage cheese salad	---	4.96*	---
27. Buttered turnips	4.72*	5.00*	5.01
	*Among 10 foods liked in present survey	*Among 10 foods liked in 1963 survey	*Among 10 foods liked in 1960 and previous survey

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